

Division of Marketing  
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**Grant Title**     Importation & Evaluation of Dairy Sheep

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**Organization**     Spooner Ag. Experimental Station  
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Wisconsin Department of Agriculture, Trade & Consumer Protection  
Agricultural Development and Diversification Program  
4th Round Grant  
Final Report

Date: August 31, 1994

WDATCP Contract No: 7050

Project Title: Importation and Evaluation of Dairy Sheep

Contractor Name: University of Wisconsin-Madison

Project Leaders: David L. Thomas, Yves Berger

Progress Report For (Dates): July 1, 1992 - June 30, 1994

Summary of Project Activities:

The project was initially funded for the one year from July 1, 1992 - June 30, 1993. An extension was granted from July 1, 1993 - June 30, 1994. This final report summarizes activities during the entire two year period.

1. Progress on Objectives

**Objective 1. Investigate the possibility of importation of foreign dairy sheep germplasm (probably of the Awassi and East Friesian breeds) with U.S. animal health authorities.**

At the start of this project, all known dairy sheep were found in countries that were not approved for direct export of sheep and goats to the U.S. No sheep, embryos or semen could enter the U.S. from countries with Foot and Mouth Disease. Sheep germplasm could be brought to the U.S. from countries free of Foot and Mouth Disease but with Scrapie under special import permits if the animals were quarantined in the U.S. for at least five years. The cost of building a quarantine facility and maintaining animals in it for at least five years was prohibitive for the UW-Madison and most producers. We initiated discussions with USDA/Animal and Plant Health Inspection Services (APHIS)/Import-Export to develop a protocol that would ensure safety from foreign disease but allow importation of dairy sheep without placement in a five-year quarantine facility.

Our discussions with USDA/APHIS have been frustrating. We introduced a resolution at the annual meeting of the U.S. Animal Health Association in November, 1992 which recommended the importation of sheep and goats from countries where Scrapie was the only disease of major concern if those animals (or embryos or semen) went into flocks enrolled in the Voluntary Scrapie Certification Program. The resolution was passed. A similar resolution was introduced by us and passed at the annual meeting of the American Sheep Industry Association in January, 1993. Due to these efforts, USDA/APHIS drafted 3 protocols which would have allowed importation of live sheep, embryos or semen from countries where the only disease of major concern to the U.S. was Scrapie if these animals or tissues went into U.S. flocks enrolled in the Voluntary Scrapie Certification Program. These protocols were sent to the Sheep and Goat Committee of the U.S. Animal Health Association for review. Due to a combination of lack of response by the sheep industry and new rulings from USDA/Veterinary Services, these protocols were not enacted and now appear to be

dead. We continue regular communications with USDA/APHIS/Import-Export but are not optimistic that permission to import germplasm directly from Europe to the U.S. will be available in the near future.

### **Objective 2. Import foreign dairy sheep germplasm.**

Both New Zealand and Australia are free of both Foot and Mouth Disease and Scrapie, and sheep can be imported with a 30-day quarantine in a USDA facility. Semen can be imported directly. An importation of Awassi dairy sheep from Cyprus to Australia came out of a 7-year quarantine in Australia in early 1994. The owners of the Awassi sheep in Australia do not seem to be in a hurry to sell semen. We processed a requisition for 57 doses of Awassi semen for \$3,420.00 on June 10, 1994 to CHAMMP International, Lewisville, Texas - a U.S. firm dealing with the Awassi interests in Australia (copy of requisition attached). We have not received this semen.

Silverstream Limited, Dunedin, New Zealand imported East Friesians from Sweden in 1992. They will come out of quarantine in April, 1996. Silverstream Ltd. has been working with USDA/APHIS to allow importation of semen to the U.S. before the sheep come out of quarantine in New Zealand. A requisition for 200 doses of East Friesian semen for \$6,000.00 was processed on June 10, 1994 to Silverstream, Ltd. with the understanding that the semen must arrive by September 1, 1995 (copy of requisition attached). We have not received this semen.

Hani Gasser, Fisher Creek Ranch, Chase, British Columbia, Canada imported East Friesian semen from one ram from Switzerland in the fall of 1992 and inseminated a number of Rideau ewes on his ranch. He advertised 1/2 East Friesian rams for sale in the spring of 1993. We made contact with Mr. Gasser and purchased 2 of these ram lambs. They arrived at the Spooner Station on August 3, 1993. In the fall of 1993, Mr. Gasser imported semen from two additional rams and inseminated his 1/2 East Friesian ewe lambs. These ewe lambs produced a few 3/4 East Friesian ram lambs in 1994. Hal Koller, sheep dairy producer from Amery, purchased two of these 3/4 East Friesian ram lambs in May, 1994. We purchased one of these rams from Mr. Koller on June 6, 1994, and the ram is now at the Spooner Agricultural Research Station.

### **Objective 3. Initiate detailed evaluation of foreign dairy sheep germplasm under experimental conditions.**

In October-November, 1993, Dorset-Romanov-Targhee and Dorset-Finn-Targhee crossbred ewes were exposed to either pure Dorset rams or to 1/2 East Friesian rams in single sire pens. The ewes lambd in March-April 1994. Routine lambing practices were followed: jug for 48 hours, tying, clipping and dipping of umbilical cord as soon after birth as possible. Lambs were given 1 cc of a selenium complex, ear tagged, weighed and the tail docked in the first 24 hours. Male lambs were not castrated. After 48 hours, lambs and ewes were put in pens containing no more than 25 ewes. Lambs had early access to a 19% CP creep ration.

Table 1 shows the lambing performance of the ewes, the survival rate of the lambs as well as their birth weights and their adjusted weights at 60 days.

Ewes mated to 1/2 East Friesian rams gave birth to more lambs than ewes mated to Dorset rams (2.38 and 2.10, respectively). The survival rate of 1/4 East Friesian lambs was very high (98.4%) and better than the survival rate of 3/4 Dorset lambs (93.3%) even though more lambs were born per ewe from ewes mated to 1/2 East Friesian rams.

Among ewes raising 1/4 East Friesian lambs, only three lambs from three different sets of triplets were raised on milk replacer. Therefore, two ewes raised single lambs, 14 ewes raised twin lambs and 12 ewes raised triplet lambs. Among ewes raising 3/4 Dorset lambs, only 1 lamb from a set of triplets was raised on milk replacer. Therefore, 13 ewes raised single lambs, 20 ewes raised twin lambs, 16 ewes raised triplet lambs and 1 ewe raised her set of quadruplets.

The mean birth weights adjusted for sex and type of birth were not significantly different between the two types of lambs although birth weights of 1/4 East Friesian lambs were consistently higher. Only birth weights of twin lambs were significantly different between the two breed groups.

The mean weight of lambs at 60 days adjusted for age of ewe, type of birth, type of rearing and sex of lamb, was 10 pounds higher for the 1/4 East Friesian lambs than for the 3/4 Dorset lambs. By combining the fertility, litter size, survival rate and adjusted weight at 60 days, ewes mated to 1/2 East Friesian rams weaned more pounds of lambs than ewes mated to Dorset rams (147.2 and 100.1 lbs., respectively).

Two weeks after weaning, ram lambs from both genotypes were switched to a 14% CP ration composed mainly of whole corn, rye, oats, molasses, soybean meal, lasalocid, minerals and ammonium chloride. Lambs had no access to forage besides fresh straw bedding given approximately every other day. Feed was given on a free choice basis. Daily consumption of feed was calculated by weighing the amount given and weighing the amount refused. All lambs were weighed on a weekly basis. The composition of the ration given to the lambs is presented in Table 2.

Twenty-eight 1/4 East Friesian and 20 3/4 Dorset ram lambs were placed in two adjacent pens. The lambs were chosen on the basis of weight and age in order to have two groups of approximately the same average weight and the same average age at the start of the trial. Table 3 shows by week, the daily gains and the amount of feed consumed for 1 pound of gain.

East Friesian lambs grew faster than Dorset lambs (.95 and .76 lbs./day, respectively) with similar feed efficiency of approximately 4.6 pounds of feed per pound of gain. The fastest growing East Friesian had a total ADG of 1.19.

Table 4 shows the weekly variation in ADG and feed efficiency. From week to week, ADG and feed efficiency varied tremendously, although the daily feed intake was fairly constant in both groups of lambs at around 3 - 3.5% of their body weight in dry matter. For both groups, feed intake as well as energy intake, are quite adequate. The daily consumption of crude protein was below the recommended level given by NRC (1985) for animals of this weight and growth potential. Dorset lambs consumed 77% of their protein requirements and East Friesian lambs 83%. Therefore, the low protein level of the ration might have had a detrimental effect on the growth of the lambs.

In conclusion, 1/4 East Friesian lambs:

- had a very high rate of survival to weaning with no evidence of any particular health problems thereafter,
- grew faster from birth to 60 days of age than Dorset-sired lambs,
- grew faster from weaning to 120 lbs. than Dorset-sired lambs,
- had the same feed efficiency as Dorset-sired lambs.

Table 1. Lambing performance, survival and weight at birth and at 60 days ( $\pm$  standard errors)

	Breed of sire of lambs	
	Dorset	1/2 East Friesian
# ewes at breeding	52	26
# of ewes at lambing	52	26
# of ewes aborted	0	0
# of ewes lambed	50	26
# of lambs born	105	62
Fertility	96%	100%
Litter size	2.10	2.38
# of lambs alive at weaning	98	61
Survival rate	93.3%	98.4%
Average Birth Wt.	9.4	10.04
Birth wt. of single	(13) <sup>a</sup> 10.8 $\pm$ .38	NS (2) 11.04 $\pm$ .93
of twins	(40) 9.4 $\pm$ .2	** (24) 10.6 $\pm$ .27
of triplets	(48) 7.9 $\pm$ .2	NS (36) 8.5 $\pm$ .23
of quadruplet	(4) 6.1	
Adjusted wt. at 60 days	53.14 $\pm$ .94	** 62.76 $\pm$ 1.22
Total wt. of lambs weaned per ewe present at breeding	100.1	147.2

<sup>a</sup>Numbers in parentheses are the number of lambs of the corresponding birth type.

Table 2. Composition of the Ration

Ingredient	lb/t as fed	DM	TDN (lb.)	CP (lb.)	Ca (lb.)	P (lb.)
Whole corn	1500	1335	1254.9	133.5	2.67	4.67
Rye	100	89	75.7	11.9	.06	.34
Oats	100	89	66.8	11.7	.10	.34
Bovatec	170	153	127.0	74.5	.46	1.07
Molasses	80	62	46.5	5.4	.13	.02
Mineral	10	---	---	---	1.0	.5
Lime	30	---	---	---	3.38	.002
Ammonium Chloride	10	---	---	---	---	---
per lb of DM	2000	1728	1570.9	237	5.4	7.0
		100%	91%	14%	.3%	.4%

Table 3. Postweaning average daily gain and feed efficiency ( $\pm$  standard error)

	<u>Dorset</u>		<u>East Friesian</u>
# of ram lambs	20		28
Age at start (days)	80.4 $\pm$ 1.18	NS	78.8 $\pm$ 1.03
Wt. at start	74.2 $\pm$ 3.11	NS	78.3 $\pm$ 2.7
Length of trial	48 d.		48d.
Wt. at end	110.9 $\pm$ 4.02	**	123.8 $\pm$ 3.49
ADG, start - end	.76 $\pm$ .04	**	.95 $\pm$ .04
Feed efficiency	4.57	NS	4.55

Table 4. Weekly ADG and feed efficiency ( $\pm$  standard error)

<u>Weeks</u>	<u>ADG, lb./day</u>			<u>Feed efficiency, feed/gain</u>		
	<u>Dorset</u>		<u>East Friesian</u>	<u>Dorset</u>		<u>East Friesian</u>
1	.68 $\pm$ .11	NS	.73 $\pm$ .10	4.17 $\pm$ .20	NS	4.42 $\pm$ .20
2	.47 $\pm$ .09	**	.67 $\pm$ .08	6.79 $\pm$ .21	**	5.32 $\pm$ .21
3	1.13 $\pm$ .11	*	.96 $\pm$ .10	3.05 $\pm$ .21	**	5.32 $\pm$ .21
4	.89 $\pm$ .11	**	1.35 $\pm$ .10	4.06 $\pm$ .10	NS	3.20 $\pm$ .21
5	.59 $\pm$ .10	*	.84 $\pm$ .09	5.17 $\pm$ .21	NS	4.85 $\pm$ .21
6	.81 $\pm$ .08	*	.98 $\pm$ .07	3.97 $\pm$ .21	NS	4.56 $\pm$ .21
7	.76 $\pm$ .11	**	1.12 $\pm$ .10	4.94 $\pm$ .20	NS	4.07 $\pm$ .25

#### Future Research Plans

The 49 1/4 East Friesian ewe lambs and a similar number of Dorset-sired controls at Spooner will be mated in two groups - from September 19 to October 24 or from October 26 to December 1, 1994 to lamb in February to April, 1995. The ewe lambs will be evaluated for lamb production and for commercial milk production in 1995. Some of the ewe lambs will be mated in 1994 to the new 3/4 East Friesian ram lamb, producing some 1/2 East Friesian lambs for future evaluation.

#### Objective 4. Initiate field test of foreign dairy sheep germplasm on the farms of Wisconsin producers.

During October, 1993 one of the 1/2 East Friesian rams was sent to UW-River Falls for a cooperative research project. He was mated to Columbia ewes. The resulting East Friesian x Columbia cross ewes will be compared with purebred Columbia ewes to determine if the increased milk production expected from the crosses will result in improved lamb survival and lamb weights. There are no results yet available on this study.

During November and December, 1993 the two UW-Madison 1/4 East Friesian rams and one purchased by Diane Kaufmann of Chippewa Falls were sent to the Pipestone Veterinary Clinic, Pipestone, MN where approximately 400 doses of semen were collected and frozen from each ram.

Semen from these three rams was used by Yves Berger to inseminate ewes in four sheep dairy flocks in early 1994. The flocks, date of insemination, number of ewes inseminated and results were as follows:

Flock	Date inseminated	No. ewes inseminated	No. ewes lambing	<u>No. lambs born</u>	
				Males	Females
Judy Moses, New Richmond	1/26/94	19	1	1	
Mary Jarvis, Poplar	2/21/94	36	14	14	12
Jeff & Sharon Foster, Colfax	2/23/94	25	11	5	10
Hal & Cyndi Koller, Amery	3/15/94	19	5	4	1

Insemination of ewes in cooperator flocks with the 1/2 East Friesian semen will expand in 1994. Even though the grant period is over, semen and AI supplies purchased on the grant will be used in 1994. Following is the schedule and the approximate number of ewes to be inseminated.

Flock	Date to be inseminated	No. ewes inseminated
Jim & Sandy Morris, Mosinee	9/15/94	40
Larry & Gayle Fickbaum, Port Wing	10/14/94	20
Dan & Sandy Lothe, Sun Prairie	10/15/94	20
Hall & Cyndi Koller, Amery	10/28/94	20
Brian & Jane Fyksen, Spencer	11/16/94	30
Tom & Chris Romenesko, Kaukauna	11/20/94	30
David & Mary Falk, Grantsburg	11/29/94	30
Dan & Sandy Lothe, Sun Prairie	12/1/94	20
Jeff & Sharon Foster, Colfax	12/2/94	30
Greg & Diane Kaufmann	12/3/94	30
Rusty & Mary Jarvis	12/5/94	30

## Other Activities Related to the Original Objectives

### Group Breeding Activities

Yves Berger and I have met with the Wisconsin sheep dairy producers in August and October, 1993 at Spooner, in March, 1994 at Madison and in August, 1994 at Spooner to discuss the coordination of a genetic improvement program for dairy sheep in Wisconsin. The inseminations in 1993 and 1994 will result in daughters from the three 1/2 East Friesian rams in several flocks which will allow all sheep in all flocks to be compared genetically.

Diane Kaufmann has developed a data recording form which is being used to collect milk production records in 3 flocks in 1994. These forms will be submitted to our lab for data analyses. This will be the start of our dairy sheep genetic evaluations. The blank forms are duplicated at UW-Madison and sent to producers. More flocks will be milk recorded in 1995. Five electronic scales have been purchased with ADD funds and have been loaned to dairy sheep producers for milk weighing.

### National Convention

Yves Berger is working closely with a number of the Wisconsin sheep dairy producers and the North American Dairy Sheep Association (NADSA) to host the national convention of NADSA and a Dairy Sheep Symposium in Wisconsin in 1995. Current plans are to hold

the symposium and convention in Madison in conjunction with the Wisconsin Sheep Industry Conference from March 30 - April 1, 1995.

#### Industry Growth

Enthusiasm for the dairy sheep industry is growing. In 1992, when this grant started, there were three producers milking ewes in Wisconsin. One of those original producers is out of the business, but the remaining two have been joined by five additional producers to bring to seven the number that milked in 1994. All seven of these current producers plan to be milking in 1995, and they may be joined by as many as seven new producers in 1995. Hal Koller and Diane Kaufmann have formed Wisconsin Meadows, a company which has contracted with Bass Lake Cheese Factory to process their milk into cheese. Wisconsin Meadows does their own marketing of cheese. Four producers in Wisconsin market their milk through Wisconsin Meadows. Wisconsin Meadows joins La Paysanne, a sheep cheese plant at Hinckley, Minnesota, as a buyer of Wisconsin sheep's milk; increasing marketing options for producers.